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FIELD MAINTENANCE OF ROUTED WOOD SIGNS

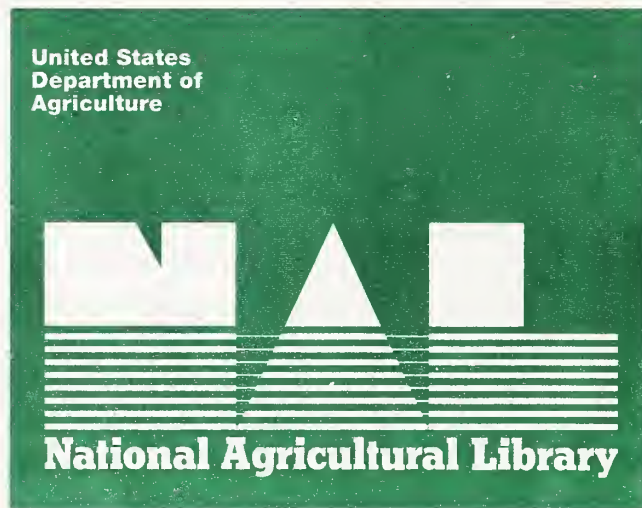


U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EQUIPMENT DEVELOPMENT CENTER,
MISSOULA, MONTANA

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ABSTRACT

This report presents a method for repairing and repainting routed wood signs without removing them from field sites. The basic maintenance unit is a pickup truck equipped with handtools, powertools, paint spray unit, and paints. A portable generator provides electric power for the power-tools and paint sprayer. The report includes a list of tools, primer, and paints. The maintenance method is shown in step-by-step illustrations.



FIELD MAINTENANCE OF ROUTED WOOD SIGNS

April 1970

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U.S. Department of Agriculture
Forest Service
Equipment Development Center
Missoula, Montana

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INTRODUCTION

The Forest Service annually spends about \$3.5 million providing signs to guide Forest users. Existing Forest Service signs are estimated to represent an investment of \$18 million. Most of these are routed signs made of dimension lumber, plywood, or a combination of both materials. Because of weathering and damage, many of these signs need to be repaired and refinished. The Equipment Development Center at Missoula has devised a method for repairing and refinishing signs in the field. This method of maintenance does not require sign removal, and one man can do the complete job.

For several field seasons, the Center has tested this maintenance method on nearby Ranger Districts. Limited testing of paints and primers has been done in the field and in the Center's accelerated weathering laboratory. The findings of this work are the basis for the method and materials presented in this report.

SIGN MAINTENANCE STEPS



1. Clean weeds and brush from around the sign posts. Remove brush and limbs that obscure the sign.

2. Scrape off loose paint with a wire brush. Dress all bullet holes and damaged wood with a knife.

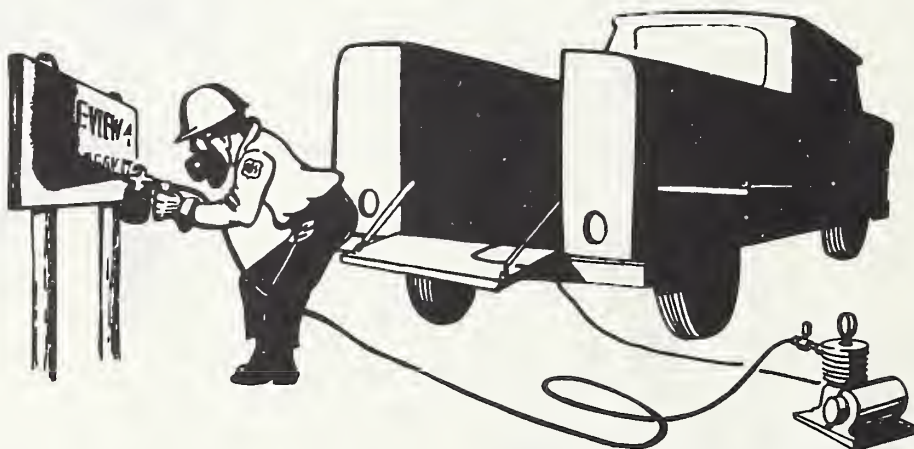


3. Fill cracks, holes, and imperfections with wood filler.

4. Using a portable electric sander, sand the surface of the sign.



5. Dust off sign with air hose.



6. If the sign has not been primed (either when manufactured or when previously maintained), spray entire sign and posts with oil-base primer.

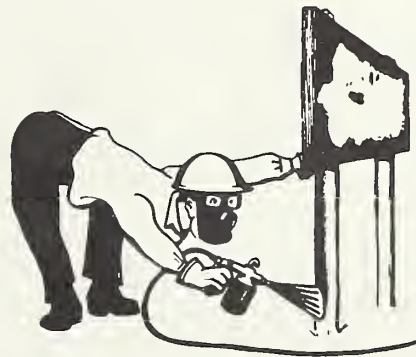
Priming is essential for a durable finish. Oil-base primer requires at least 12 hours to dry, so you have to move on to the next sign. Do not apply a finish coat on a primed sign until the primer is thoroughly dry. Every sign should have a prime coat to fill the porous sections of raw wood. Once the sign has been primed, it should not be necessary to prime it on subsequent visits if only minor patching is needed. Wood dough patching does not require priming.



7. With the sign properly primed, spray the letters, the spaces between the letters, and the immediate area around the letters with a quick-drying (2-hour) enamel, or Codit* if reflection is required.

*Codit is a quick-drying enamel containing glass beads that reflect light.

8. While the letter paint is surface-drying, paint the posts and background with quick-drying enamel.



9. After the message enamel has surface-dried, apply background enamel to the face with a special roller. A 1/8-inch thick polysponge roller is required because a standard fabric-type roller will spread paint into the routed letters. It is important to avoid getting too much paint on the roller and to use light pressure on the sign face. Because of this, it is difficult to rapidly cover the paint used for the message. Moving the roller in a criss-cross pattern may speed coverage. A polysponge roller tends to trap air, and air bubbles may form on the sign. Bubbles can be eliminated by rolling the face with a dry roller. The message enamel does not have to be completely dry, it has to be just dry enough so background enamel can be rolled over it without smearing.

10. Touch up letters with an artist's brush if background paint has accidentally slopped in- to letters.



DISCUSSION

Before each sign is maintained, it should be evaluated for adequacy, location, and value. If a sign needs message revision, extensive repair, or if the sign does not comply with Handbook standards, a new sign should be purchased.

A sign that you cannot reach with an extension cord can be maintained by a brush-roller combination. The letters, the spaces between the letters, and the immediate area around the letters can be painted with a brush and the background can be painted with a roller.

Dusty roads, rain, extreme temperature, and other environment factors can cause delays in carrying out a schedule based on this maintenance method. Since many signs have never been primed, an extra trip is required to first prime the sign (and 12 hours must be allowed for the primer to dry). Administrators may dislike the two trips needed for the unprimed signs, but once a sign is primed, future maintenance should require only one trip for painting. A series of signs can be primed one day, finish-coated the next day and should not cause a serious scheduling problem.

Judgment and ingenuity will be needed to adapt the maintenance method to local conditions. Signs used by the Forest Service today are made from a wide range of materials, and it is impossible to provide a method that covers every local condition. The fieldman is encouraged to contact this Center or his regional sign coordinator for assistance in solving difficult problems.

This procedure has the following advantages:

1. It should be the most economical method for maintaining signs.
2. It will no longer be necessary to remove the sign from its supports, transport it to a shop for maintenance, return it to its site, and remount it.
3. It will eliminate the time a site is without a useful sign.
4. One man can do the job.
5. It allows direct control by the local administrator of a regular maintenance schedule.

OPERATING AND SAFETY TIPS

1. Plan sign maintenance when the forecast is for fair weather and temperatures above 50 degrees.
2. Do not paint a sign that has a hot surface from exposure to sunlight. Preferably, the sign should be painted early in the morning or late in the evening when the surface has cooled.
3. To make it easier to clean your hands, coat them with lanolin or Hand Guard.
4. While not in use, rollers, paint guns, brushes, etc., used with oil-base paint or primer should be immersed in turpentine or petroleum-base thinner.
5. Rags and sponges used to apply oil-base STAINS can be readily ignited by spontaneous combustion. Avoid this by using brushes to apply stains [FSM 3.34(5)].
6. Paper towels or Kimwipes can often be used instead of wiping rags.
7. Keep spray gun cans covered with fruit jar lids at all times so that the paint does not dry.
8. Toothpicks are handy for cleaning spray gun nozzles.
9. As a maintenance man becomes familiar with the method, he may develop special techniques that meet local conditions, save time, or improve the durability and appearance of the sign. Administrators should watch for good innovations and have them submitted as employee's suggestions.

EQUIPMENT AND SUPPLIES

A 3/4-ton pickup with a utility body proved very convenient for maintaining signs in place. The outside compartments (fig. 1) protect the equipment and supplies from the weather, are easily reached, and can be locked.

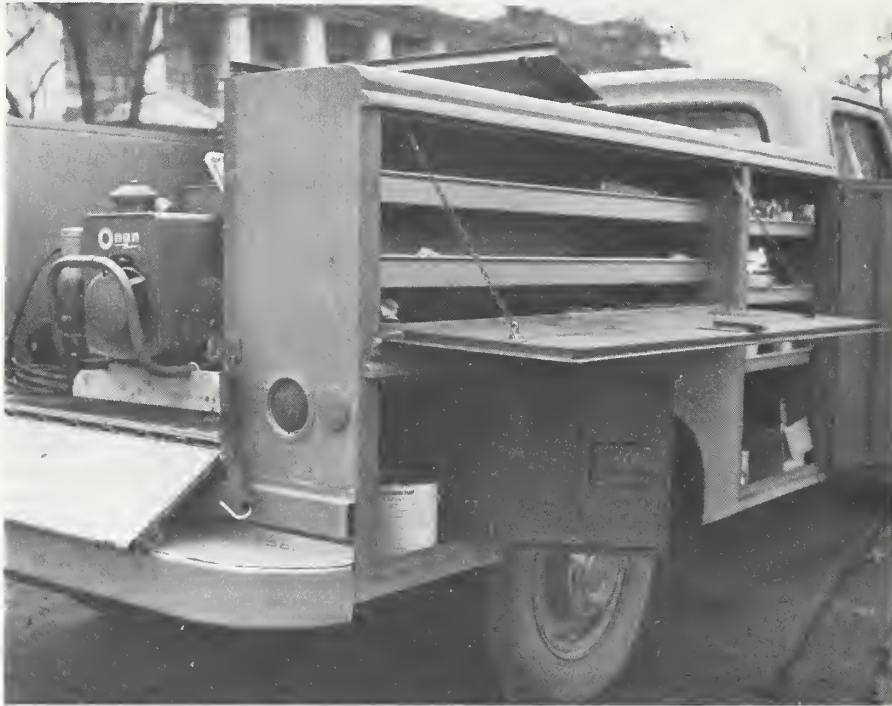


Figure 1.—A 3/4-ton pickup equipped for maintaining signs.

A gasoline-engine, 110-volt generator provides electric power. The generator is left in the truck, and enough extension cord is provided to reach the sign where various powertools and the spray gun will be used.

During tests, two 50-foot extension cords were included with the equipment. Only one of these 50-foot cords was used during all test conditions encountered. If the signs to be maintained are not more than 100 feet from the road, SO-type No. 16 wire will be adequate. If powertools are to be used beyond 100 feet, No. 12 wire should be used. Because of voltage drop, extension cords longer than 1,000 feet should not be used.

Any compressor must be equipped with a regulator to obtain correct spraying pressure. The Center had good results with the "Speedy" sprayer model 892M which has a surge chamber in the head of the compressor.

Both internal and external mixing nozzles are commercially available. The external mixing nozzle gives the best atomization and has a broader range of spray pattern control. This is important in precision spraying of relatively small areas. In all tests, the technicians have preferred the external mixing nozzle.

Sample boards should be used to determine the proper pressure levels because results will vary with the type and viscosity of paint.

Preliminary findings indicate oil-base paint protects the wood better than latex paint. Latex paints are porous and allow moisture to pass to and from the wood surface. Eventually, the wood surface lifts and the paint cracks and separates from the wood. Oil-base paints are not porous and protect the wood from changes in moisture content.

A good grade oil-base paint is recommended. The Center had good results during both laboratory and field tests with Fuller's* oil-base paints. Oil-base paints that were used during our tests included:

Fuller's No. 119-30 Knox Gold (2-3 hour quick-dry, 1 hour to surface-dry)
enamel (for letters) U. S. Forest Service Color Chip No. B-108.

Fuller's No. 120-50 (178) Exterior Oil-Base Primer, White (12 hours to dry).

Fuller's No. 160-19 Western Brown Oil-Base Paint (8 oz. Black colorant added
per gallon) U. S. Forest Service Color Chip No. 259 (20 minutes to dry).

Use of the Fuller's paint by the Center and the information provided about this paint is for the convenience of the fieldman who must select the paints. The Center does not intend official evaluation or endorsement of Fuller's products to the exclusion of others which may be suitable. The Center is currently working with GSA on paints that are provided through the Federal Supply System because sign administrators have had trouble controlling color and paint quality within acceptable limits.

The Equipment Development Center at Missoula found useful the materials, handtools and powertools listed in the Appendix. Many of the items are already on hand on the Ranger District, and many of the items would prove useful for routine maintenance work wherever wood products and buildings are being built or maintained.

*In the Southeast, Fuller Products are sold by Dixie-O'Brien Paint Company. In all other parts of the country, Fuller-O'Brien Corporation handles the Fuller paints.

APPENDIX
SUPPLIES AND EQUIPMENT
COST ESTIMATE

NOTE: The appendix presents a complete list of materials, handtools, and powertools the Center found useful for sign maintenance. Estimated costs and the Center's sources as of the date of this report are presented. Useful but not absolutely essential items are marked with an asterisk.

EQUIPMENT AND MATERIALS	FEDERAL STOCK NUMBERS OR COMMERCIAL SOURCE	ESTIMATED COST
Generator, 110-v., 1500-w., gasoline engine	Onan or similar	\$ 329.00
Sander, portable, electric, orbital	5130-596-9727	33.00
Compressor and gun outfit with accumulator, Speedy 892M with 1/2-hp motor and 312 gun with internal and external mix nozzles, regula- tor and gage, Speedy 622, 3 extra paint gun cans @ \$2	W. R. Brown Corporation 2701 N. Normandy Avenue Chicago, Illinois 60635	94.50 6.00
*Saw, electric, 7-1/4" (Porter Cable)	GSA contract, make and Federal number changes each year	43.00
*Router (Stanley H260-A), Base (Stanley H279-A) and Bits, 1/2" double-fluted, flat; 1/2" V-grooved	GSA contract, make and Federal number changes each year	50.00
Fruit jar lids	Local grocery	.50
Roller kit, paint	8020-597-4759-7" 8020-689-5379-9"	.82 .99
Roller, polyfoam plastic, 1/8" max. thickness (These wear quickly and should be purchased in half-dozen lots.)	Wooster Brush Company (Magikoter Tiz R-206) Wooster, Ohio or Thompson Products Co. Johnson City, Tenn.	.30
Filler, wood, paste, natural colored, 1 lb. cans	8010-262-9172	.46
Putty knife	5120-221-1536	.19
*Trowel, small pointer	5120-246-4350	.69
Trash can, 10-gallon, lock top, plastic (2)	7240-965-4427 (each)	3.20
Container, water, 5-gallon (2)	8100-08R-0047 (each)	2.70
Toothpicks, round, wood	7350-838-3919	.07
Kimwipes	7920-965-1709 (case)	9.20
Extension cords, 50 feet (2) Type SO-AWG 16 wire (12 AWG optional)	Made up (each)	12.00
Artists' brushes (6)	8020-224-8028 (each)	.90
Pulaski	5120-293-3467	5.50
Shovel	5120-293-3335	3.45
*Bars-Nail (1) -Wrecking (1)	5120-965-0879 5120-293-0665	1.24 1.10

*Optional equipment

EQUIPMENT AND MATERIALS	FEDERAL STOCK NUMBERS OR COMMERCIAL SOURCE	ESTIMATED COST
Sandpaper, 80-100-120 grit, open face, 9 x 11 sheets, 100 sheets each	5350-221-0883-80 5350-186-8820-100 5350-221-0882-120	\$ 1.30 2.00 2.20
Barricades, "Men Working" and fold- ing stands	Regional Administrative Services	
Paint scraper, 8-1/2"	5110-595-9575	1.70
Wire brush	7920-291-5815	.36
Wrenches, open end, adjustable	5120-240-5328-8" 5120-264-3796-12"	1.00 1.70
Pliers, 6" slip joint	5120-223-7396	.64
Pliers, cutting, diagonal, 6"	5110-239-8253	1.45
Hammer, Claw	5120-223-9124	1.55
Tape, 6', steel, measuring	5210-541-3324	.85
*Level and plumb, carpenters	5210-926-5430	3.00
*C Clamps, 6 x 2-1/4" (6)	5120-203-6431 (each)	3.35
*Square, carpenters	5210-810-3490	1.99
*Brace bit, ratchet, 12" sweep	5110-221-1188	6.90
*Bits, wood boring, tapered square shank	5133-293-2901-1/4" 5133-293-0276-5/16" 5133-293-2902-3/8" 5133-293-2899-7/16"	.59 .56 .46 .47
Window screening, 12" x 12", or paint strainers	Local builders supply	.50
Masking tape	7510-266-6694	.75
*Chisels, wood	5110-585-8425-3/8" (6/36) 5110-585-8429-1" (6/36)	1.25 1.52
*Chisel, cold	5110-186-7107-5-3/4 x 1/2" (12/48)	.18
*Punch	5120-242-3435-3/32"	.10
*Rasp, wood, 12", flat	5110-233-9718 (6/72)	1.18
Thinner, dope and lacquer, 1 gal.(cleaning)	8010-160-5787	.93
Primer, oil-base, wood	Fullers No. 120-50 (178) (gallon) Exterior Oil-base primer, White or equal	5.00

*Optional equipment

EQUIPMENT AND MATERIALS	FEDERAL STOCK NUMBERS OR COMMERCIAL SOURCE	ESTIMATED COST
Enamel (for letters)	Fullers No. 119-30 Knox Gold (2-3 hour quick-dry enamel) F. S. Color Chip, No. B-108 (or equal)	(gallon) 8.50
Paint, oil-base, exterior wood	Fullers No. 160-19 Western Brown Oil-Base Paint (8 oz. Black colorant added per gallon) F. S. Color Chip No. 259 (or equal)	(gallon) 8.50
Thinner, paint, odorless, volatile, mineral spirit	8010-837-7969	.77
Reflective material for letters 3M Codit SFF 66F	3M Company Minneapolis, Minn.	Prices available on request.
Plastic Safety Goggles, coverall type	4240-052-3776 (standard pack 72)	.48
Gloves, work, leather	8415-634-4664	1.30
Respirator, paint spray protection 2-cartridge type with 2 class four paint spray cartridges and 4 spray filters, Bureau of Mines Approval No. 23B-18, Fed. Sup. Schedule 42, Part II, June 1, 1968-May 31, 1969.	4240-817-9233 Welsh Mfg. Co. 9 Magnolia St. Providence, R. I. 02909 Tel. 401-351-3400	3.50
3/4-ton pickup with utility body	Regional Vehicle Pool	

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